

Exposure Investigation August 2011 Urine Sampling Results Summary Fact Sheet

What was tested and how was it tested?

Staff from the federal Agency for Toxic Substances and Disease Registry (ATSDR) and Oregon Health Authority (OHA) collected 66 urine samples from 38 households between Aug. 30 and Aug. 31, 2011. This sample collection was intended to provide a baseline assessment of exposure in the community, and was conducted during the time of year when herbicide use is generally considered to be at its lowest level. Results from two participants were excluded from the report due to their age and the inability to compare their results to a nationally representative study.

Samples were collected from participants at their homes, frozen on dry ice, and shipped overnight to the laboratory at the National Center for Environmental Health (NCEH) at the Centers for Disease Control and Prevention (CDC) headquarters in Atlanta, Ga. The NCEH lab analyzed the samples for 2,4-D and atrazine, along with atrazine breakdown products.

Why only 2,4,-D and atrazine?

Of the 11 herbicides used on forest lands in the area, 2,4,-D and atrazine are the only two for which laboratory methods have been developed to detect their presence in urine.

What were the basic results of the urine testing?

Atrazine:

- None of the participants had atrazine or any of its breakdown products in their urine samples.

2,4-D:

- Five of the participants did not have any 2,4,D detected in their urine samples.
- Six participants had levels of 2,4-D that ATSDR considers elevated, as compared to the levels found in the general U.S. population, as reported by NHANES¹.
- The results ranged from undetectable to 37.33 micrograms per gram (µg/g) of creatinine².
- The average level was 0.4 µg/g.

What is NHANES?

The National Health and Nutrition Examination Survey (NHANES) is a nationwide health survey that involves the collection of biological information (for example, blood pressure, urine, blood, weight, height) to establish a general sense for the health status of the U.S. population. Biomonitoring is the collection and testing of biological specimens (for example, blood, urine, hair) to monitor the country's health status. NHANES is an annual survey that reports on many health indicators, including the results of 212 chemicals measured in the blood or urine of thousands of participants across the United States. NHANES findings show that chemical exposures are widespread among Americans.

The NHANES results for 2,4-D show that 95 percent of the U.S. population has levels of 2,4-D in their urine that are below 1.08 µg/g.

¹National Health and Nutrition Examination Survey (NHANES) 4th National Report on Human Exposure to Environmental Chemicals
<http://www.cdc.gov/exposurereport/>.

² All 2,4-D urine concentrations are creatinine-adjusted and are expressed as micrograms of 2,4-D per gram of creatinine (µg/g).

Do the results indicate there is a health risk in our community?

All of the results from the August 2011 urine sampling are well below the reference value for 2,4-D. The reference value for 2,4-D is more than 1,000 times less than the lowest dose shown to cause harmful health effects in animals. The comparison value for 2,4-D in urine is called the Biomonitoring Equivalent (BE), which is 300 µg/g of creatinine for long-term, or chronic, exposures. That level is more than eight times higher than the highest level found in the August urine sample results.

ATSDR acknowledges there are uncertainties in the science of toxicology, and that people have unique susceptibilities to chemicals. However, the reference value is considered to be protective of the most sensitive individuals, including children. Existing science indicates that, at the low levels reported in this first round of sampling, health problems are not expected.

What is going to happen now?

OHA will collect urine samples from residents immediately after a nearby forest land application of 2,4-D and atrazine. This will help to determine whether people are being exposed from that source, as opposed to other more common sources, such as weed killers that can be purchased from garden stores.

OHA is now preparing to collect urine samples from residents in the spring, both before and within 24 hours after a nearby application of pesticides.

Can I participate in the investigation?

To find out more, or to sign up as a potential volunteer, please contact Karen Bishop at karen.bishop@state.or.us, or call 1-877-290-6767.

More information about 2,4-D:

2,4-D is a herbicide widely used to kill broadleaf plants. It is applied to farm and forest lands by professional applicators, but it is also an active ingredient in many common herbicides available to the public at lawn and garden stores. For a complete list of products containing 2,4-D that are registered in Oregon, [click here](#), or call 1-877-290-6767 to have this information sent to you.

KEY MESSAGES AND TALKING POINTS:

1. Protecting the health of communities from harmful exposures is ATSDR's top priority.
 - *ATSDR collected urine samples from 64 people in 38 households in western Lane County, OR.*
 - *Samples were analyzed by the CDC's Environmental Health Laboratory, the top facility worldwide for this kind of tests.*
 - *ATSDR provided funding and expertise to develop and perform the urine sampling and analyze the results.*
2. Urine tests showed herbicide levels [among participants] below those reported to cause adverse health effects.
 - *We specifically looked for signs of two of the most commonly used pesticides, **atrazine and 2,4-D**.*
 - *We found that NONE of the urine samples from participants contained a detectable concentration of **atrazine**. This means that those volunteers whose urine we tested had NOT been exposed to **atrazine** within a week before being tested.*
 - *We found that EI participants, when compared to the rest of the US population, showed a greater concentration of **2,4-D** in their urine; however, studies have shown NO harmful effects at those levels either.*
3. ATSDR recommends conducting more testing right after herbicide applications.
 - *Despite the fact that urine tests showed herbicide levels below those reported to cause adverse health effects, ATSDR understands and cares about the concerns that community members have about potential exposures **after chemicals are applied**.*
 - *The Oregon Health Authority, as part of the multiagency group known as the Pesticide Analytical and Response Center or PARC, is working on a plan to test for **atrazine and 2,4-D** in urine immediately after herbicide application.*
 - *The first step will be to conduct urine sampling before forest areas are sprayed with the herbicide.*
 - *The second step will be follow-up testing within 24 hours after spraying.*

Background information:

In September of 2009, EPA asked ATSDR to help them look into community concerns about possible exposure to herbicides in western Lane County, OR. While forestry is the predominant land use in this area, pesticides are also used within or near the sample area for agricultural, road right-of-way, residential, and other uses.

On August 30 and 31, 2011, prior to the forestry fall spraying season, ATSDR collected urine samples from 64 people in 38 households living near forest areas where herbicides are applied to recently clear-cut tracts of land at certain times of the year.

ATSDR provided funding and expertise to develop and perform the urine sampling and analyze the results. ATSDR conducted an Exposure Investigation or EI, and CDC's Environmental Health Laboratory analyzed participants' urine to see if atrazine and 2,4-dichlorophenoxyacetic acid (2,4-D) were present in their urine and if they were being exposed to these chemicals.

FAQs:

1. I am worried about the levels found in six of the members of my community. Scientists would not label them as elevated if there was not something negative about being exposed to those substances at those levels. I am worried about having any level of 2,4-D in myself and my children.

The levels are elevated in comparison to the levels typically found in 95% of the general US population. However, the available scientific information indicates that people exposed to the levels found would NOT be expected to experience harmful health effects.

1.a. I know that I have symptoms related to being exposed to these supposedly low levels of herbicides. How can you say it doesn't cause adverse health effects?

*I wish I could tell you that we already know what is causing your symptoms. However, it is scientifically very difficult to prove a connection between symptoms and exposures to **specific substances**. And scientists currently agree that the impacts of exposure to 2,4-D at the levels found in participants' urine would NOT be expected to cause harmful health effects.*

We are not saying that the pesticide isn't making you sick, only that the current science doesn't allow us to make the link between your symptoms and exposure to herbicides.

The levels found in urine from people in this community haven't been associated with illness in humans. However, if you feel sick, you need to talk to your doctor, if you haven't done so or continue your treatment if you have already started one.

1.b. Any amount of these herbicides in my body or my children's bodies is unacceptable! What are you going to do to stop those exposures and, if you can't do anything about it, what other agency can?

*ATSDR understands that nobody wants **any** harmful chemicals in his or her body. Because we live in an industrial society, chemicals are in everyone. ATSDR's role is to help determine whether the levels found can make people sick and offer advice on ways to reduce exposure. We do that by offering recommendations to citizens to control their own exposures and/or to agencies that have authority to change current practices or require cleanup.*

1.c. There is new research suggesting that even low levels of chemicals can cause the kind of health problems I am experiencing. I have read information that these pesticides are endocrine disruptors. What does that mean?

Endocrine disruptors are substances that are harmful to the body's hormones and keep them from working properly.

1.d. Is ATSDR considering the newest scientific information in this EI?

ATSDR is aware of research showing that certain chemicals seem to exhibit endocrine disruptor effects at low doses. However, much of this new information comes from studies looking at single cells in a laboratory. It is difficult to interpret how these chemicals might produce these same effects in humans in real life situations. ATSDR is looking further into understanding how this research can be applied to humans.

2. Further testing is needed to assess short-term exposures that could happen immediately following herbicide applications to recently clear-cut forestlands. When are those tests going to be conducted?

*The Oregon Health Authority, as part of the multiagency group known as the Pesticide Analytical and Response Center or PARC, is working on a plan to test for the presence of **atrazine** and **2,4-D** in urine immediately after herbicide application to clear cut land. You can contact OHA for further details.*

2.b. Who has to request them and from whom?

You can contact OHA for further details.

2.c. Who will be in charge of conducting them?

The Oregon Health Authority, as part of PARC.

2.d. What can I expect from those tests?

The urine samples will be analyzed for 2,4-D and atrazine. Participants can expect to receive a letter explaining the results of the test after the laboratory analyzes how much of these chemicals are in their urine.

2.e. What can we do now, in the meantime?

Right now you do not need to do anything that is outside of your regular routine.

2.e.1. But I have symptoms! You cannot tell me to just sit and wait!

Please seek medical care if you can, or call the Oregon Health Authority at 1877-290-6767.

3. Can you tell me more about the substances you analyzed?

Atrazine:

Atrazine is used to kill weeds, mainly on farms, but has also been used on highway and railroad rights-of-way. Only trained people are allowed to spray it. For humans, the urinary half-life* for atrazine is 24-28 hours. Atrazine is a moderately persistent pesticide* in the environment. In soil, atrazine has a half-life of 14-109 days, whereas in water, its half-life can be 200 days or more (ATSDR, 2003).

For more information on atrazine, please visit the Agency for Toxic Substances and Disease Registry page on atrazine at www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=59#13.

2,4-D:

2,4-D is an herbicide used to kill broad leaf vegetation. It is applied to farm and forest lands by professionals, but it is also a common ingredient in many products sold at lawn and garden stores for use around the home, often in liquid form.

For more information on atrazine, please visit www.epa.gov/teach/chem_summ/24D_summary.pdf and www.atsdr.cdc.gov/phs/phs.asp?id=939&tid=195.

(*See FAQs- questions 10 and 11)

3.a. What about the other chemicals that were tested for in soil/water/food?

Those results will be communicated back to the participants in a letter from OHA as soon as the results are available and have been checked by EPA for quality assurance.

4. How did you choose the exposure investigation participants?

Participants for this EI were volunteers are older than 6 years of age, live within 1.5 miles of a 2010-2011 clear-cut area, and do not apply pesticides as an occupation.

5. Do the results apply to other communities in similar geographic conditions?

No, the test results from this investigation are specific to the participants in this exposure investigation. The results are not intended to be applied to the community-at-large or to other communities.

6. What is the difference between chronic and acute exposure?

Acute exposure is the contact with a substance that occurs once or for only a short time (up to 14 days). Chronic exposure, on the other hand, is the contact with a substance that occurs over a long time (more than 1 year).

For more information on this or other terms, please visit ATSDR's Glossary of Terms: www.atsdr.cdc.gov/glossary.html.

7. Landowners have reported to the Oregon Department of Forestry that they have used, or have permission to use, the following herbicides on forestlands in the Highway 36 corridor: atrazine, hexazinone, imazapyr, sulfometuronmethyl, metsulfuronmethyl, 2,4-D, clopyralid, glyphosate, triclopyr, aminopyralid, and picloram.

Why did you only test for atrazine and 2,4-D?

These chemicals were selected as target compounds because:

- the National Center for Environmental Health laboratory has existing analytical methods for these chemicals,
- these chemicals (or their metabolite(s)) are included in the National Health and Nutrition Examination Survey (NHANES), a program of studies designed to assess the health and nutritional status of adults and children in the United States.
- these chemicals are commonly sprayed on the clear-cut areas, and
- to follow up on an earlier report that elevated concentrations of these chemicals were detected in some residents.

7.b. What about the rest of the chemicals?

US EPA and OHA tested for those chemicals in soil, food and water in September 2011, and plans are underway by EPA to test for these chemicals in the air during the spring of 2012.

7.b.1. But what about in humans? Is it possible that they are only in the environment?

The methods don't exist to test for these other chemicals in urine. That doesn't mean that they will not get into humans, only that we can't test for their presence in urine.

7.c. We know we are being exposed to a cocktail of herbicides out here – what do you know about the combinations of these chemicals? How will they affect my (my children's) health and development?

Without data showing the presence of these chemicals in humans or the environment, ATSDR cannot determine what exposures are occurring. Where possible, ATSDR evaluates the effects that combinations of chemicals pose to human health, but the science is limited in its ability to offer definitive answers.

8. Urine samples were collected on August 30-31, 2011, prior to fall spraying operations. Why wasn't this test done right after the spraying?

We wanted to establish baseline results so that we could compare them against future post-spray results. The purpose was to evaluate possible sources of chronic exposure to pesticides which might be occurring in the community through pathways other than spraying. The purpose of the planned spring sampling is to determine the impacts of spraying on exposure in nearby residents.

8.1. What do you mean by establishing a baseline? Why is that relevant for our community at this point?

Humans may be exposed to these chemicals from sources other than spraying such as in food and consumer products. We needed to determine the levels of the chemicals that commonly appear in members of the community. Then when we test their urine after spraying, we can see how much the spraying might be increasing exposure to them.

9. Can you explain to us what metabolites are?

A metabolite is a breakdown product of a chemical.

10. What do you mean by "urinary half-life?"

Once you ingest a chemical, the half-life is the time that takes for half of that product to be eliminated in the urine.

11. What do you mean when you say "Atrazine is a moderately persistent pesticide?"

Moderately persistent means that it takes days and not months for a chemical to be eliminated from the body.

12. What did ATSDR exactly do in this investigation?

ATSDR's role is to determine if exposures to contaminants in pesticides are high enough for us to make recommendations about reducing exposure to these substances.

The ATSDR Exposure Investigation and Site Assessment Branch (EISAB) was the lead for this Exposure Investigation. ATSDR and OHA worked together to produce this EI. The CDC's National Center for Environmental Health (NCEH) laboratory contributed to the investigation by analyzing the urine samples. The specific roles of the agencies that participated in this investigation were:

The ATSDR Exposure Investigation and Site Assessment Branch (EISAB)

- Developed the EI protocol*
- Worked with OHA to conduct the field activities and obtain written informed consent/assent/parental permission for testing*
- Collected urine samples from the participants and shipped them to the NCEH laboratory for analysis*
- Evaluated the analytical test results*
- Notified the participants of their individual test results*
- Prepared this report that summarizes the collective findings of the EI*

The ATSDR Division of Regional Operations (DRO), for region 10:

- Met with the community on several occasions
- Provided background information
- Coordinated with agencies in the development of the investigation
- Assisted in the gathering of urine samples on August 30-31, 2011
- Served as a point of contact with community members

The following table illustrates the role of each agency involved in the Investigation:

	Media/ Data type	Agency					
		Sample Collection	Lab Analysis	Receive/access to raw data	Data Analysis	Report Individual Results	Report aggregate results
Human	Urine biosamples	ATSDR with assistance from OHA	CDCNCEH lab	ATSDR, OHA	ATSDR and OHA	ATSDR (in coordination with OHA)	ATSDR (urine only) OHA (all data)
	Survey data	OHA	N/A	OHA, EPA, DEQ, ODA	OHA	N/A	OHA
Environ- mental	Water	EPA	DEQ	DEQ, OHA, EPA	OHA	OHA	OHA
	Food	EPA	ODA	ODA, OHA, EPA	OHA	OHA	OHA
	Soil	EPA	ODA	ODA, OHA, EPA	OHA	OHA	OHA
Spray documentation	Spray notifications and records for forestry applications	ODF	N/A	OHA	OHA	N/A	OHA
	Spray notifications and records for all other applications	ODA	N/A	OHA	OHA	N/A	OHA